



Growing Canopy & Community in South Providence

IMPACT CERTIFICATION REPORT

February 2023



EXECUTIVE SUMMARY

Trees for Social Impact

Reforest cities, enrich communities

Trees are one part of the equation in building a future for everyone to thrive. With the majority of the U.S. population in cities and towns, it's imperative that we create livable communities that support the health and well-being of all residents.

City Forest Credits (CFC) is a national nonprofit organization that provides pathways for businesses to contribute to society and urban forests in metropolitan areas across the United States. Companies can fund certified high-value planting projects with human health, social equity, and environmental impacts. Impact Certification allows companies to make local investments that leverage their social impact dollars where it matters most, trust in the robust standards, and report on data with confidence.

Providence Neighborhood Planting Program (PNPP) led the Growing Canopy and Community in South Providence Impact Project. The planning and implementation for this project was a collaborative effort, including Providence Forestry Division, Groundwork Rhode Island, students and staff at participating schools, the Providence Housing Authority, members of the Providence Tree Plan Steering Committee, community members, and residents.

This impact project includes human health, social equity, and environment impacts connected to ten UN Sustainable Development Goals.

Between September 2021 and December 2022, 190 trees were planted in the Upper and Lower South Providence and Washington Park neighborhoods of Providence, Rhode Island. The main goal of this project was to directly address the disproportionate environmental health burdens that under-canopied and under-resourced areas bear, with a focus on poor air quality and urban heat island effect.

The heart of the project, both socially and geographically, was the Juanita Sanchez Educational Complex (JSEC): a five-acre plot of land which houses two Providence Public High schools. JSEC serves as a focal point in the community and almost completely treeless. Other planting sites included other K-12 school properties, street trees in front of homes and businesses, and on several public housing properties owned by the Providence Housing Authority. Most tree plantings were conducted by residents or students.

This project used an intergenerational and cross-institutional approach to build strong organizational, community and neighborhood relationships to increase tree equity and build more resilient urban communities.

CONTENTS

01	Introduction
02	Project Overview
04	Impact Summary
06	Human Health
08	Social Equity
10	Environment
12	UN Sustainable Development Goals



Introduction

Impact Certification Purpose

City Forest Credits (CFC) is dedicated to creating greener, healthier, and more equitable cities across the country. CFC developed Impact Certification to accelerate access for urban forest leaders to private-sector funding to achieve high-value planting projects in cities.

We are losing more than 36 million urban trees per year in the United States. At the same time, we are increasing the size and density of our urban areas. There is a lack of public funding for city forests and inequitable distribution across neighborhoods.

To meet the diverse needs of metropolitan areas, we developed Impact Certification to provide a new set of tools for communities, nonprofit organizations and local governments to design planting projects and connect to upfront funding. Based on the latest scientific and technical resources, Impact Certification is the first project-scale tool to comprehensively assess and demonstrate human health, social equity, and environmental benefits of trees. Certification from a trustworthy national platform allows companies an efficient pathway to identify and provide funds for community-driven projects that align with corporate goals and improve communities.

Overview

CFC's role is to certify the design and implementation of tree projects and illustrate the triple bottom line impacts. We created this assessment framework to address planting design, process, and best practices, with flexibility to incorporate relevant local elements. Local leads can design a project of any size, then evaluate outcomes using the Impact Scorecard. The Scorecard lists design considerations to prompt ideas and encourage forward-thinking projects, including elements such as site selection in underserved neighborhoods, inclusive and respectful community engagement, and climate action with quantified ecosystem benefits. A background report with additional details is available upon request.

This Impact Report includes a summary of the scores per category, as well as the breakdown of each theme and project achievements. Activities that contribute to UN Sustainable Development Goals are included, along with examples that can be used for voluntary reporting. The CFC Impact Project Directory webpage hosts information about the certified impact project and provides an easy way to share outcomes with communities, employees, and stakeholders.

Create a more equitable future, one tree at a time

PROJECT OVERVIEW

Providence Neighborhood Planting Program (PNPP) led the Growing Canopy and Community in South Providence Impact Project. The planning and implementation for this project was a collaborative effort, including Providence Forestry Division, Groundwork Rhode Island, students and staff at participating schools, the Providence Housing Authority, members of the Providence Tree Plan Steering Committee, community members, and residents.

Between September 2021 and December 2022, 190 trees were planted in the Upper and Lower South Providence and Washington Park neighborhoods of Providence, Rhode Island. The neighborhoods on the south side of Providence where this project takes place have some of the lowest income levels and highest childhood asthma rates in Rhode Island - a state that ranks ninth overall in the nation for child asthma rates. Bordered on two sides by Interstate 95 and the Port of Providence, 94% of residents are non-white, rates of homeownership are low, and it is one of the parts of the city most impacted by urban heat island effect. The tree canopy in these neighborhoods is more than 8% below the city-wide average--among the lowest in the city.

The heart of the project was the Juanita Sanchez Educational Complex. Other planting sites included K-12 school properties, street trees in front of private homes and businesses, and on public housing properties owned by the Providence Housing Authority.

The main goal of this project was to directly address the disproportionate environmental health burdens that under-canopied and under-resourced areas bear, with a focus on poor air quality and urban heat island effect. This project used an intergenerational and cross-institutional approach to build strong organizational, community and neighborhood relationships to increase tree equity and build more resilient urban communities.

PROJECT PROFILE

LOCATION	Providence, RI
OPERATOR	Providence Neighborhood Planting Program
FUNDERS	<ul style="list-style-type: none">• State of Rhode Island• City of Providence• Rhode Island Foundation<ul style="list-style-type: none">◦ Mary Elizabeth Sharpe Endowment◦ Helen Walker Raleigh Providence Tree Care Trust
BUDGET	\$88,360

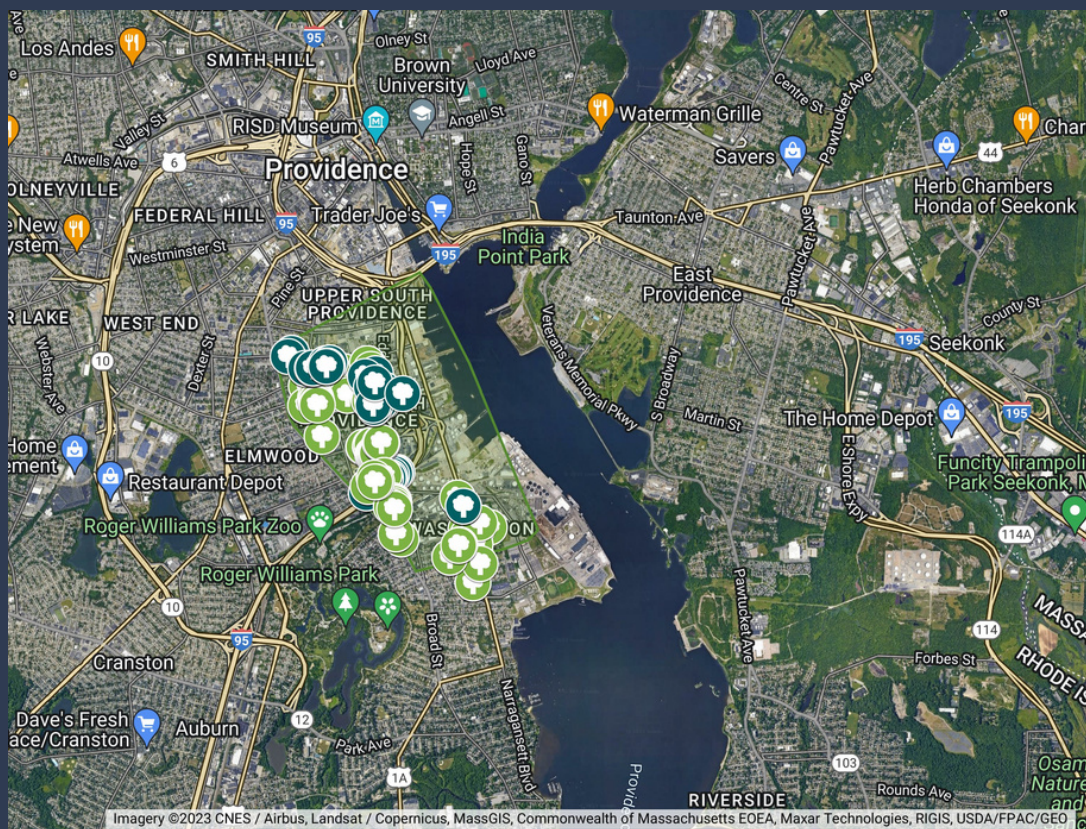
Project Goals

- **Improve air quality**
Provide a green buffer from pollutants
- **Reduce urban heat**
Create shade and reduce extreme heat effects for vulnerable populations
- **Empower residents and students**
Engage and train community members in project design and long-term stewardship
- **Build resilient communities**
Community-led, multi-stakeholder approach; address past environmental injustices

LOCATION



[Interactive Google Map](#)



SCORES

The Impact Scorecard is divided into three categories: Human Health, Social Equity, and Environment. Each category contains classifications of outcomes within each category, referred to as themes. Categories are organized into 5 themes, with 15 impacts, and 30 indicators, for a total of 90 possible indicators across a project. Each indicator is worth 1 to 3 points, with a total of 50 points per category.

CFC assigned points based on project actions that achieve the biggest positive impact. Certain indicators that are site specific or unique can claim additional points. There is no minimum category score requirement, however local operators must complete the required section for each category. The required actions ensure that there is a base level of understanding about a community's health, equity, and environmental context. Most local operators will not be able to include every indicator in a project. Instead the scores illustrate the merits of a project, with a tiered ranking.



Impact Summary

Growing Canopy & Community in South Providence
Providence, RI
Providence Neighborhood Planting Program (PNPP)



Project Goals

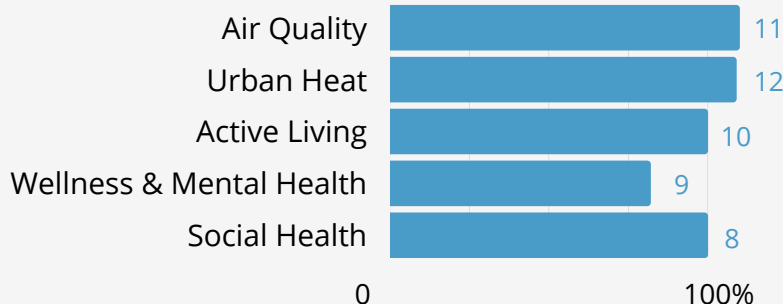
Between September 2021 and December 2022, PNPP, project partners, and community-members planted 190 trees in the Upper and Lower South Providence and Washington Park neighborhoods of Providence, Rhode Island. The main goal of this project was to directly address the disproportionate environmental health burdens that under-canopied and under-resourced areas face, with a focus on improving air quality, reducing urban heat island effect, empowering students and residents, and building more resilient communities.



Human Health



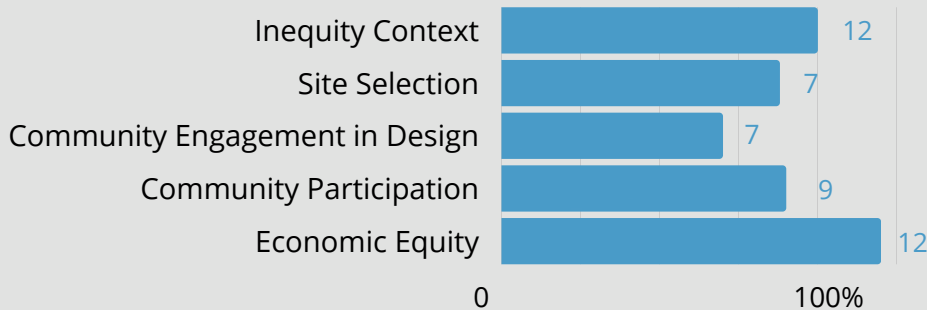
50/50
Exceptional



Social Equity



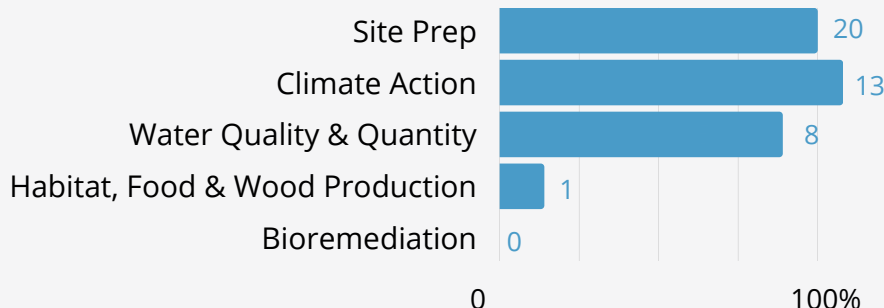
47/50
Exceptional



Environment



42/50
Exceptional



Impact Summary

Growing Canopy & Community in South Providence



Increase tree equity and build resilient communities

This project was a collaborative effort, including Providence Forestry Division, Groundwork Rhode Island, students and staff at participating schools, the Providence Housing Authority, members of the Providence Tree Plan Steering Committee, community members, and residents. Trees were planted at schools, at private homes and businesses, and on public housing properties. Project partners conducted extensive community engagement and outreach to design the project and provided volunteer and paid opportunities for youth and community-members to implement the tree planting. Students and community members were empowered to plug in, develop social capital and take ownership of the tree planting projects that will lead to increased health and resiliency.

UN Sustainable Development Goals



Filter air and provide shade for improved health



Increase water capture and infiltration



Ongoing community-based tree care



Address past environmental injustices



Improve access to green spaces and livability



Reduce heat and energy needs



Deliver local climate action, quantify benefits



Increase soil health and biodiversity



Inclusive, community-centric approach



Multi-stakeholder partnerships

Quantified Benefits

Projected values (avoided costs) for ecosystem benefits per year in 25 years

Carbon Sequestration

154.4 metric tons of CO₂
\$3,680 (at \$25/ton)

Rain Interception

1,416.8 m³/year
\$2,994 per year

Air Quality

O₃: 0.0474 t/yr
NO_x: 0.0200 t/yr
PM₁₀: 0.0230 t/yr
\$1,117 per year

Energy Savings

Electricity - 18,121.5 kWh/yr
Natural Gas - 664,026.9 kBtu/yr
\$11,826 per year

HUMAN HEALTH IMPACTS



CATEGORY SCORE

50/50

Exceptional

THEMES

POINTS

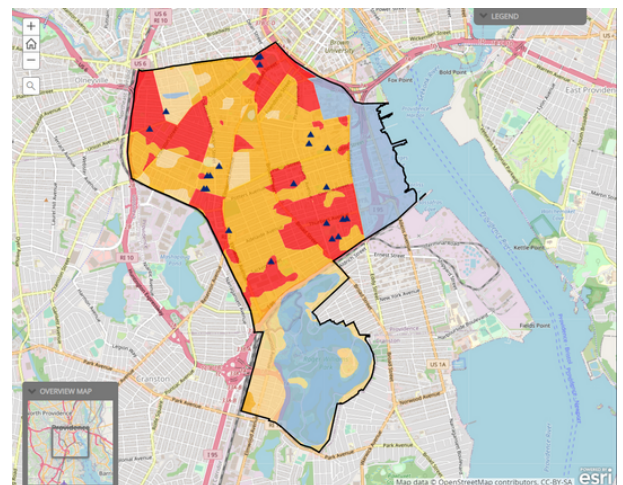
Air Quality and Respiratory Effects	11
Urban Heat Effects	12
Physical Activity and Active Living	10
Wellness and Mental Health	9
Connections and Cohesion for Social Health	8

Local Data

The neighborhoods of South Providence have some of the lowest income levels and highest childhood asthma rates in Rhode Island - a state that ranks ninth overall in the nation for child asthma rates. The RI Department of Health has identified zip code 02905 as a “Health Equity Zone,” which is an area with longstanding social, economic, racial and environmental inequities which have resulted in adverse health outcomes for residents. Some of the factors that contribute include close proximity to Interstate 95 and the Port of Providence, poor quality of housing stock, lack of access to health services, and lack of green space and tree canopy. In particular asthma rates in Providence are some of the highest in the country, with a 2019 study pointing to I-95 as a major culprit for poor health outcomes. The project area population is mostly comprised of people of color, and has high percentages of children, high rates of unemployment, low incomes, and poor health outcomes. It has multiple K-12 schools and publicly subsidized housing units.

Urban Heat Effects

The project area has among of the highest summer temperatures in the city due to its location, many parking lots, and a lack of trees. The RI Department of Health’s Extreme Heat Impacts in Health Equity Zones identified the project area as scoring very high. Most of the trees were planted along the right of way or sidewalks. As these trees grow, they will provide shade and cooling. New canopy cover on residential streets and at public spaces where students and community members gather will help to address extreme heat impacts.



[Extreme Heat Impacts in Rhode Island Health Equity Zones Storymap](#)

HUMAN HEALTH IMPACTS

Air Quality and Respiratory Effects

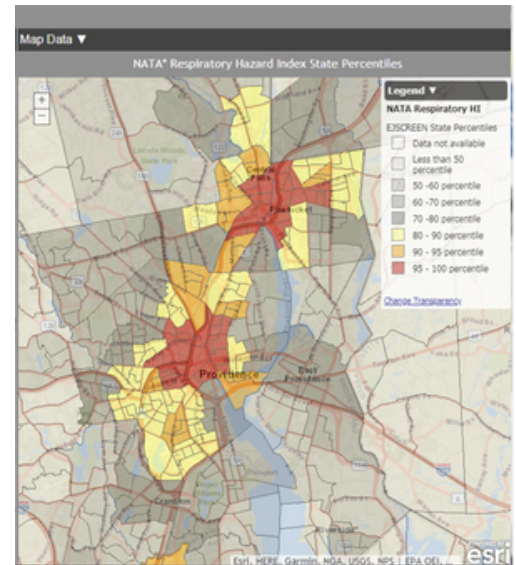
Residents, students, and workers are exposed to disproportionately large amounts of air pollution in the project area. In addition to the highway, there are several high-traffic major thoroughfares which run along and through the area. Allens Ave immediately borders the Port and carries a constant stream of heavy trucking and machinery. High numbers of large diesel trucks are frequently parked and idling for long stretches of time as they wait to load and unload at the Port. Winds most frequently come off of Narragansett Bay, moving pollutants directly into these neighborhoods.

In addition to planting trees along busy corridors, this project focused on siting trees near homes, schools, churches and other community gathering spaces in an attempt to provide targeted local particulate filtration at these vulnerable sites and maximize positive impacts for neighborhood residents. The Juanita Sanchez Education Complex in particular is particularly vulnerable to air pollutants. Tree sites and species were selected with the goal of providing a green buffer.

Project partners used the Climate and Health Species List for Rhode Island Urban Trees to guide species selection. Trees will filter out smaller pollutants (such as NOx) during respiration, their leaves will be able to gather particulate matter as air moves through the canopy, and the shade the trees cast will minimize the amount of ozone created by preventing interactions of sunlight and pollutants.

Physical Activity and Active Living

Students walk long distances through the neighborhood to get to school or wait at bus stops. Car ownership rates are low in the neighborhood, and many adults take the bus or walk or bike to get places within and outside of the neighborhood. The addition of street trees and the focus on adding trees at bus stops and other places where people gather and wait outdoors, will make it easier, healthier and more enjoyable for community members to walk, bike and take the bus.



EPA Environmental Justice Screen , Respiratory Hazards Map (Rhode Island Department of Health)



Planting trees along Allens Ave.

SOCIAL EQUITY IMPACTS



CATEGORY SCORE

47/50

Exceptional

THEMES

Inequity Context	12
Site Selection	7
Community Engagement in Design	7
Community Participation in Implementation	9
Economic Equity	12

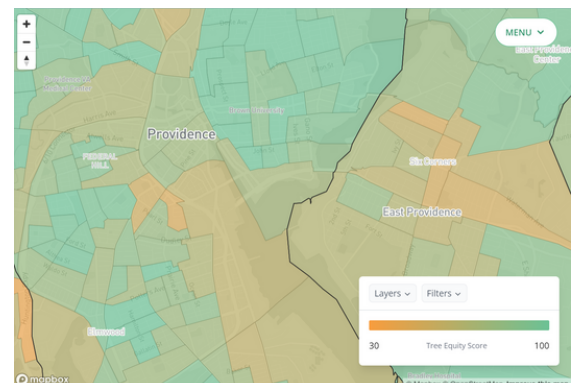
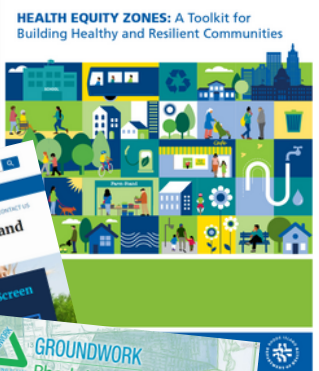
POINTS

Inequity Context and Site Selection

The impacts of redlining, highway construction and many decades of disinvestment are still felt sharply on the south side of Providence today. Providence has the fifth largest income inequality gap of any US city and the neighborhoods on the south side are among the poorest in Providence. It is a location in which many of the social determinants of poor health converge - traffic, noise, pollution, heat, poverty, and housing insecurity.

The project area has a designation by the Rhode Island Department of Health as a Health Equity Zone. Numerous federal, state, and local dashboards and tools such as the EPA Environmental Justice Screen, Opportunity Atlas, and the Tree Equity Score Analyzer all point to this area as being one of the top priorities in the city. The story maps and report put out by the RI Department of Environmental Management and the RI Department of Health in early 2022 demonstrate multiple ways that low tree canopy mirrors social vulnerability in this part of the Providence.

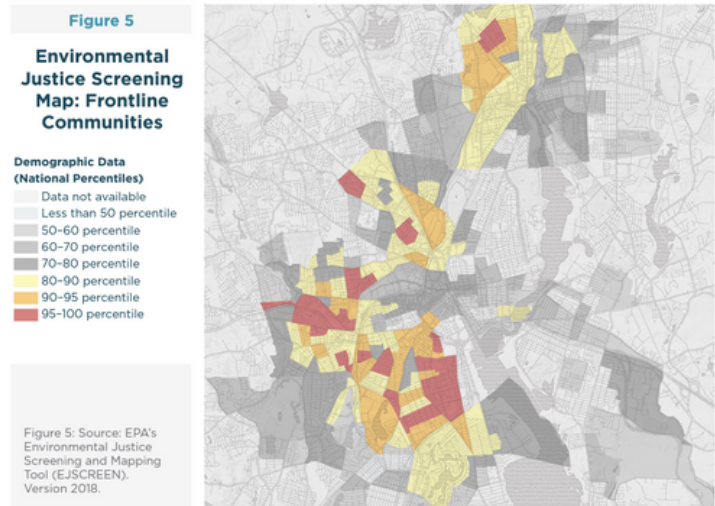
Federal, state, and local dashboards and tools were consulted in the project planning process.



[American Forest's Tree Equity Score Analyzer](#)

SOCIAL EQUITY IMPACTS

The City of Providence's 2020 Climate Justice Plan also identified South Providence and Washington Park as one of the areas that has borne the brunt of environmental injustice. Historically, trees were planted most often where they were requested by property owners. People who rent their homes may feel that they can't make decisions about the installation of a new tree. The neighborhood has many Providence Housing Authority properties and other low income housing units, and a low rate of owner-occupancy properties--



with around 75% of the neighborhood residents being renters. There has been little to no previous effort to solicit input or engage residents in these communities in decision making related to tree planting or maintenance.

Project partners learned that residents, particularly older residents, have had negative experiences in the past in relation to trees. One resident of Sayles Ave who had lived there his whole life described coming home from school one day and seeing that the giant trees which then lined both sides of the street were in the process of being completely removed. He described viscerally the shock and feeling of loss he felt at seeing his street suddenly devoid of trees, with no warning and said “they just never replaced them, and we haven’t had trees here since.” This resident was very excited to receive trees in front of his house through this project, and he and his granddaughter planted them together and have been caring for and monitoring them since.

The project area also encompasses many schools and daycare centers including JSEC campus schools, Bailey Elementary, and Nuestro Mundo. Five other elementary and middle school sites were included as well as the Community College of Rhode Island, a highly utilized Boys & Girls Club location, small in-home daycares, and several elder care facilities.

Community Engagement in Project Design

Staff coordinating the tree plantings were primarily white while many of the residents and students were of BIPOC identity. Project partners took great care to acknowledge the fraught histories of white environmental nonprofits working in predominantly BIPOC communities. For example, project leads offered options and technical support in decision making around tree siting and selection and tried to avoid imposing values or priorities. Project partners met on site with any tree recipient who requested it, to talk through exactly where the trees would go, explain “right tree, right place” considerations and restraints related to utility and infrastructure, and make sure that people felt informed about and comfortable with the placement decision and species selection.

SOCIAL EQUITY IMPACTS

While labor intensive, this approach is essential for building trust and relationships--especially in communities where there is mistrust of both city programs and traditionally white-led nonprofits--and helps ensure that in addition to having a stake in the tree's existence, community members have agency and decision-making power in relation to greening their neighborhood.

When conducting outreach to recruit additional planting participants from the neighborhood, multiple methods and platforms were used: phone, text, door-knocking and flier distribution, presentations at community meetings and religious services.


Project partners met with some of the core social/cultural hubs in the neighborhood to connect further with residents and community members, including Ephese Haitian Seventh-day Adventist Church, Mt Zion Church of God, the Buddhist Center of New England, the Washington Park Neighborhood Association, and the Southside Boys & Girls Club.

Outreach and program materials were bilingual in English and Spanish, with occasional translation to other languages for specific project partners/constituency. The PVD Tree Plan community survey was translated into the nine languages most commonly spoken among Providence's immigrant population.

Community Participation in Project Implementation

Trees were planted by residents and students. By involving people with the trees from the first day, the project helped strengthen bonds, established more community ties, and made each tree feel a bit more special to the residents who planted it, creating a greater sense of collective accomplishment and ownership.

In addition to the participation by the Green Alliance Ecology Club and PVD Tree Plan Steering Committee Members, community involvement included students and teachers at 360 High School and William B Cooley High School, Nuestro Mundo School, Providence Housing Authority staff and residents, Groundwork Rhode Island's Youth Green Team and GroundCorp Jobs Training Crew, churches and temples, and dozens of individual residents. PNPP, the City Forestry Division and Groundwork RI are continuing to build the relationships begun through this project, and have multiple community-led plantings already in the works for 2023.



Planting trees along Pavilion Street

FOCUS ON CHILDREN AND SCHOOLS

The heart of the project, both socially and geographically, is the Juanita Sanchez Educational Complex (JSEC): a five acre plot of land which houses two Providence Public High schools and serves as a focal point in the community. Many of the trees were planted on or around school grounds, including at JSEC, Robert Bailey Elementary School, and Nuestro Mundo Elementary. In addition to working with school administrators to ensure trees were planted in appropriate locations, project partners also made a point to connect with students through this project.

At JSEC, partners worked with the 360 HS Green Alliance Ecology Club, as well as the Cavalier Garden Committee to plan and select all of the tree locations, according to their vision for their campus. Partners took neighborhood “tree walks” to discuss the value of trees and green infrastructure in Providence. Partners held workshops and conversations around the topics of tree equity, and how the Providence (PVD) Tree Plan might be able to address them. A biology teacher incorporated tree lessons into his classroom teaching, to coincide with the tree planting activities that students participated in. Students in one of the 360 High School math classes used the city street tree inventory data for the neighborhood surrounding the school to learn about statistics and data analysis. At Nuestro Mundo Elementary, in addition to helping plant the trees at the sites, students also participated in tree-focused learning workshops led by local environmental educator 15 Minute Field Trips and staff at Coalition Center for Environmental Sustainability (CC4ES).



Tree planting at JSEC 360 Arbor Day



Tree planting with Nuestro Mundo students

Trees were strategically designed to enhance the natural environment of the school yards and adjacent parks. At Robert Bailey Elementary the tree installations were designed to complement a newly renovated park and “green schoolyard,” creating shaded play and seating areas. At Nuestro Mundo Elementary, trees were sited to complement the outdoor classroom and teaching garden being installed at the school. At JSEC, the tree layout was designed to create shaded walking paths from the various building entrances to the bus stops, pickup/dropoff areas and parking lots. Trees were also used to surround and enhance the outdoor classroom/seating area and native perennial planting bed.

These green spaces will provide students of all ages with places to learn and socialize that cultivate calm and foster creativity and learning. The increased canopy will also benefit parents, grandparents and all those who gather and utilize these areas.

ENVIRONMENT IMPACTS



CATEGORY SCORE

42/50

Exceptional

THEMES

POINTS

Site Prep and Implementation	20
Climate Action	13
Water Quality and Quantity	8
Habitat, Food, and Wood Production	1
Bioremediation	0

Climate Action

Fifty tree species were planted, all of which perform well on city streets in the project climate zone. Project partners also consulted the Climate and Health Species List for Rhode Island Urban Trees.

The project will deliver local climate action and ecosystem co-benefits such as carbon storage, energy savings from reduced heating and cooling costs, stormwater mitigation, and air quality improvements. The project area can get extremely windy. The many non-tree-lined streets in the neighborhood convert into wind tunnels on blustery days, which lowers the feels-like temperature during winter months. As they reach maturity, the trees planted will help to block the wind and keep homes and schools warmer in the winter. Shade and transpiration will provide cooling benefits to those same homes and schools during the summertime.

To quantify these impacts, the project used City Forest Credits' quantification tools to estimate the carbon stored, ecosystem co-benefit resource units and projected value (in avoided costs) provided by the trees when they reach 25 years of age. See SDG 12 and 13 for more information.

Quantified Ecosystem Benefits

Carbon Sequestration

154.4 t CO₂
\$3,860 (at \$25/ton)

Rain Interception

1,416.8 m³/year
\$2,994 per year

Air Quality

O₃: 0.0474 t/yr
NO_x: 0.0200 t/yr
PM₁₀: 0.0230 t/yr
\$1,117 per year

Energy Savings

Electricity - 18,121.5 kWh/yr
Natural Gas - 664,026.9 kBtu/yr
\$11,826 per year

ENVIRONMENT IMPACTS

Site Prep and Stewardship

Maintenance of trees once they are planted is essential for their long-term survival. Trees will be on a two-year watering schedule — performed either by a contractor hired by the City of Providence or through a community watering project coordinated by PNPP. Prior to planting, each tree planting site is prepped appropriately, to optimize tree health, improve soil volume and quality, and to support maximum stormwater infiltration. Young trees may be pruned after the first few years of growth by the Providence Community Tree Keepers, and then added to the City's 10-year block pruning rotation.

PNPP purchased trees and materials from local vendors that they have been working with to plant trees in Providence for many years. These longstanding relationships ensure that they can receive the diversity of plants needed each season to continue to grow a resilient urban forest. All trees were purchased from Bigelow Nurseries, which is located in Northborough, MA, less than 50 miles from Providence. The tree species list was curated collaboratively with the Providence City Forester, PNPP, and Bigelow Nurseries staff to ensure that there was appropriate stock available.



360 High School Planting Event, Photo Credit Dominique Sindayiganza



SUSTAINABLE DEVELOPMENT GOALS



Transparency is quickly becoming the standard for conducting business and reporting on sustainability progress. In 2015, all United Nations Member States agreed to the 2030 Agenda for Sustainable Development, sharing a blueprint for peace and prosperity for people and the planet, now and into the future. UN Member States recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests.

The 17 UN Sustainable Development Goals (SDGs) are part of a plan to eradicate extreme poverty and tyranny via development, with more consideration given to the planet. The SDGs are an urgent call for action and global partnership among all countries, representing key benchmarks for creating a better world and environment for everyone.

There are 169 targets and associated indicators for the 17 SDGs. A 2016 report by the UN Food and Agriculture Organization emphasizes many of the contributions urban forests make towards the SDGs. We analyzed the impacts and indicators in our Impact Scorecard, and determined alignment in outcomes for 11 SDGs. The following is a description of how each CFC indicator drives action towards one or more SDGs.

IMPACT SDG CONNECTIONS

Growing Futures project activities by impact category mapped to UN Sustainable Development Goals

	 Human Health	 Social Equity	 Environment
 2 ZERO HUNGER			
 3 GOOD HEALTH AND WELL-BEING	X	X	X
 6 CLEAN WATER AND SANITATION		X	X
 8 DECENT WORK AND ECONOMIC GROWTH		X	X
 10 REDUCED INEQUALITIES	X	X	X
 11 SUSTAINABLE CITIES AND COMMUNITIES	X	X	X
 12 RESPONSIBLE CONSUMPTION AND PRODUCTION	X		X
 13 CLIMATE ACTION	X		X
 14 LIFE BELOW WATER			
 15 LIFE ON LAND		X	X
 16 PEACE, JUSTICE AND STRONG INSTITUTIONS	X	X	
 17 PARTNERSHIPS FOR THE GOALS	X	X	

SUSTAINABLE DEVELOPMENT GOAL 3

ENSURE HEALTHY LIVES AND PROMOTE WELL-BEING FOR ALL AGES



Target 3.4. Mental well-being and disease reduction, prevention, and treatment

Target 3.9. Reduction of illness and death from chemicals and pollutants in water, air, and soil

Forests and green spaces in and around cities provide ideal settings for many outdoor recreation and relaxation activities, thereby contributing to the prevention and treatment of non-communicable diseases and the maintenance of mental health. Urban forests filter and efficiently remove pollutants and particulates, which also helps reduce the incidence of non-communicable diseases.

- Neighborhoods on the south side of Providence have some of the lowest income levels and highest childhood asthma rates in Rhode Island - a state that ranks ninth overall in the nation for child asthma rates.
- The project area is a state-designated Health Equity Zone, which is an area with longstanding social, economic, racial and environmental inequities which have resulted in adverse health outcomes for residents.
- Plant-based allergens were reduced by not relying heavily on male versions of dioecious species. A diverse mix of species was also planted to increase biodiversity and avoid concentrations of pollen load from any one species in a particular area.
- Trees will provide a green buffer to protect people from air pollution from nearby I-95 and the major industrial Port of Providence.
- The project area has the highest summer temperatures in the city. Sites were selected to address the severe impacts of high heat. Large, broadleaf shade trees were planted to maximize leaf area index and future canopy coverage.
- All the trees were planted in or immediately adjacent to public space or the right of way, so the benefits of the planting are available to many people. The addition of trees along the street, at bus stops and other gathering places will make it easier, healthier and more enjoyable for community members to walk, bike and take the bus in the neighborhood.
- Trees will provide mental health and well-being impacts. The plantings at schools allow students, teachers and staff to be able to view and enjoy trees through their windows, when gathered outside during recess and lunch breaks, and as they come and go each day.

SUSTAINABLE DEVELOPMENT GOAL 6

ENSURE AVAILABILITY AND SUSTAINABLE MANAGEMENT OF WATER AND SANITATION FOR ALL



Target 6.3. Improve water quality by reducing pollution and minimizing release of chemicals (water quality and wastewater)

Target 6.4 Increase water-use efficiency and ensure freshwater supplies

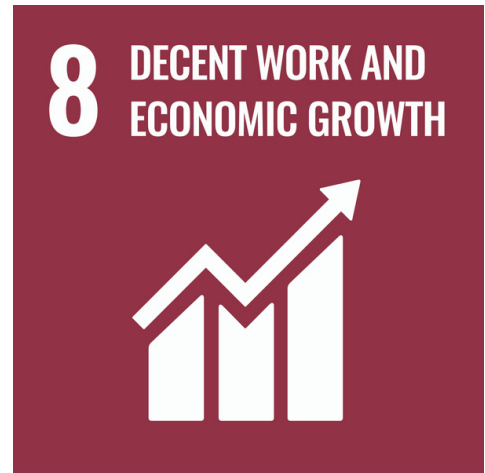
Target 6.6. Protect and restore water-related ecosystems; rivers, wetlands, forests, mountains

Urban forests are efficient regulators of urban hydrological cycles. They filter drinking water by reducing biological and chemical pollutants, reduce the risk of floods and erosion, and reduce water losses by minimizing mesoclimatic extremes through evapotranspiration processes.

- Trees were selected that perform well on city streets in the project climate zone. Some species are designed to resist certain diseases or challenging urban conditions like drought, soil compaction, and road contaminants/salt.
- Many of the tree species planted are tolerant of a variety of challenging conditions – which include both extremely dry soils and extremely wet soils. Trees that are both drought tolerant and can endure “wet feet” during stormy periods are ideal in the northeast climate and were prioritized due to their absorption capabilities. A good example of this is the River Birch (*Betula nigra*).
- No pesticides or fertilizers were used.
- Urban tree cover can increase groundwater recharge, promote the infiltration of water in soils, and decrease stormwater runoff. Prior to planting, each tree site was prepped appropriately, both to optimize tree health and to support maximum stormwater infiltration. Old, compacted soil and fill was removed and replaced with loose, aerated soil that can readily absorb stormwater and allow roots to access enough oxygen.
- When trees reach 25 years old, the trees from this project will capture 1,416.8 cubic meters per year, with avoided costs of \$2,994 annually.

SUSTAINABLE DEVELOPMENT GOAL 8

PROMOTE SUSTAINED, INCLUSIVE AND SUSTAINABLE ECONOMIC GROWTH, FULL AND PRODUCTIVE EMPLOYMENT AND DECENT WORK FOR ALL



Target 8.3 Promote policies to support job creation and growing enterprises

Target 8.5. Productive employment and work for all, including young people

Investments in urban forests and other green infrastructure add significantly to green economic growth by providing an attractive environment for tourism and business, improving home values and rental rates, creating job opportunities, providing materials for housing, and generating savings in the costs associated with energy and the maintenance of human health.

- Trees were purchased from Bigelow Nurseries in Northborough, MA, which is a local nursery.
- Tree planting can create economic opportunities for communities. No hiring was conducted specifically for this project, but contractors such as Groundwork RI's GroundCorp Team provides, paid, hands-on work experience to graduates of their job training program as they search for permanent employment. Similarly, members of Groundwork RI's Youth Green Team are conducting summer watering and maintenance of some of the newly planted trees.
- Ongoing community-based tree care is important for long-term stewardship and survival of the trees. Youth and community members learned about the ways that tree equity impacts a community's health and future and were empowered to as "Tree Leaders" in PNPP's community tree planting program model. With training and support, they identified planting sites, conducted community outreach, and planted trees.
- Groundwork's youth GreenTeam and its GroundCorp adult green-collar jobs trainees, many of whom were from the project neighborhoods, installed some of the trees, and will help water and maintain the young trees. The GreenTeam participated in peer-to-peer learning exchanges with the JSEC students, and as part of their paid summer tree stewardship and learning work, worked on outreach and education efforts around the importance of urban trees and tree equity.

SUSTAINABLE DEVELOPMENT GOAL 10

REDUCE INEQUALITIES WITHIN AND AMONG COUNTRIES



Target 10.2. Empower and promote the social, economic, and political inclusion of all people

Target 10.3. Ensure equal opportunity and end discrimination

Research shows a large discrepancy in tree cover between high- and low-income neighborhoods. We must ensure there is equitable distribution of tree benefits to all neighborhoods and residents, but also inclusion of community members in decision-making throughout the process.

- The project area is a location in which many social determinants of poor health (traffic, noise, pollution, heat) converge. Residents of the neighborhood, who are 94% people of color, and predominantly low income, will benefit directly from improvements to air quality in the area and reduced urban heat effects.
- The emphasis on planting at and around neighborhood schools also means that children, who are especially vulnerable to poor air quality, will be key beneficiaries of the project's design. The school sites also serve as general neighborhood hubs--both socially and geographically--and the increased canopy at these sites will benefit parents, grandparents and all those who gather and utilize these areas. Everyone living or walking in the area will now receive the mental health benefits of these greener public spaces.
- All of the tree plantings at school sites were collaboratively designed and planned with students and staff, in order to coordinate with existing or planned features and to let school stakeholders take the lead and identify what planting solutions would best meet their specific needs. Students will be involved in watering and tending to the young trees as part of their classroom and extracurricular activities.
- Planting trees can create places that promote informal interactions and promote community capacity for social resilience. A number of community celebrations and gatherings were incorporated into the project over its duration. These celebrations are one way to empower and include community members and promote social cohesion.
- All outreach and program materials were bilingual in English and Spanish, with occasional translation to other languages for specific project partners/constituency (Haitian Creole and Khmer).

SUSTAINABLE DEVELOPMENT GOAL 11

MAKE CITIES INCLUSIVE, SAFE, RESILIENT AND SUSTAINABLE

Well-designed and managed urban forests make significant contributions to the environmental sustainability, economic viability and livability of cities. They help mitigate climate change and natural disasters, improve air quality, reduce stormwater management, reduce energy costs, and provide ecosystem services and public benefits. Trees improve quality of life and increase the overall well-being of our communities.

- Helping to create vibrant, green schools was a priority for this project, as it not only impacts students and teachers, but it can reverberate out into the community because so many people have a school-aged person in their family or close network.
- As trees grow, the shade of their canopy will encourage the local community to spend more time outside and foster more casual relationships that stem from incidental interaction while walking around, as well as create welcoming spaces for youth to gather at school planting sites.
- Most tree plantings were conducted by residents or students. By involving people with the trees from the first day, the project helped strengthen bonds, established more community ties, and made each tree feel a bit more special to the residents who planted it, creating a greater sense of collective accomplishment and ownership.
- Particularly in the summertime, the project area is frequently hotter and has worse air quality than areas of the city with more trees and more distance from highways and industrial corridors. Trees will filter air by absorbing harmful air pollutants and providing a natural buffer. Trees will also provide shade and cooling benefits.



Target 11.3. Enhance inclusive, sustainable urbanization and participatory planning (inclusive and sustainable urbanization)

Target 11.4. Protect the world's natural and cultural heritage

Target 11.6. Reduce the environmental impacts of cities (air pollution)

Target 11.7. Provide access to safe, accessible, and inclusive green and public spaces

SUSTAINABLE DEVELOPMENT GOAL 12

ENSURE SUSTAINABLE CONSUMPTION AND PRODUCTION PATTERNS



Target 12.2. Achieve sustainable management and efficient use of natural resources

Target 12.5 Substantial reduction of waste generation

Worldwide consumption and production — a driving force of the global economy — rest on the use of the natural environment and resources in a way that continues to have destructive impacts on the planet. USDA Forest Service research found that urban forests save approximately \$7.8 billion annually in reduced energy costs associated with heating and cooling buildings. Energy savings promote responsible resource use.

- Trees lower cooling costs by reducing regional air temperatures and providing shade. They also act as a buffer against cold winds that strip away heat, thereby providing savings on the fuel needed to heat buildings. The project area is directly adjacent to the Port of Providence, and consequently can get extremely windy. The many non-tree-lined streets in the neighborhood convert into wind tunnels on blustery days, which lowers the feels-like temperature during winter months. As they reach maturity, the trees planted will help to block the wind and keep homes and schools warmer in the winter. Shade and transpiration will provide cooling benefits to those same homes and schools during the summertime.
- Quantified annual savings – per year after 25 years
 - Cooling (electricity): 18,121.5 kWh/yr, \$2,539 in avoided cost per year
 - Heating (natural gas): 664,026.9 kBtu/yr, \$9,287 in avoided cost per year
 - Total of \$11,826 in avoided costs per year
- Planting tools and supplies were locally sourced, reducing the footprint of purchasing decisions.

SUSTAINABLE DEVELOPMENT GOAL 13

TAKE URGENT ACTION TO COMBAT CLIMATE CHANGE AND ITS IMPACTS



Target 13.1. Strengthen resilience and adaptive capacity to climate-related hazards

Trees and forests in and around cities contribute to climate-change mitigation directly by sequestering carbon and reducing greenhouse gas emissions. Urban trees also provide critical green infrastructure benefits by improving air quality, saving energy, reducing the urban heat island effect, and mitigating flooding.

- While impact projects do not produce a carbon credit, project trees still sequester carbon dioxide over their lifetime. The amount of carbon dioxide stored in trees from this impact project was calculated based on tree type, climate zone, and the 25-year CO₂ index (kg/tree) after trees reach 25 years of age. An expected 20% mortality rate of trees was included. These 109 project trees will store 154.4 tons of CO₂. If valued at \$25/ton, the total CO₂ from project trees is worth \$3,860.
- Trees are able to reduce ozone, nitric oxides, and particulate matter. Urban forests reduce pollutants through dry deposition on surfaces and uptake of pollutants into leaf stomata. When project trees reach 25 years old, they will reduce 0.0474 tons of O₃, 0.0200 tons of NO_x, and 0.0230 tons of PM₁₀ per year, with avoided cost of \$1,117 per year.
- Forest canopies normally intercept 10-40% of rainfall before it hits the ground, thereby reducing stormwater runoff. The large amount of water that a tree crown can capture during a rainfall event makes tree planting a best management practice for urban stormwater control. The trees from this project will capture 1,416.8 cubic meters per year, with avoided costs of \$2,994 per year after 25 years.
- As described in SDG 12, project trees will save energy, resulting in avoided costs of \$11,826 per year once they reach 25 years old.

SUSTAINABLE DEVELOPMENT GOAL 15

PROTECT, RESTORE AND PROMOTE SUSTAINABLE USE OF TERRESTRIAL ECOSYSTEMS, SUSTAINABLY MANAGE FORESTS, COMBAT DESERTIFICATION, AND HALT AND REVERSE LAND DEGRADATION AND HALT BIODIVERSITY LOSS



Target 15.2. End deforestation and restore degraded forests

Target 15.3. End desertification and restore degraded land

According to the Food and Agriculture Organization of the United Nations, urban forests help create and enhance habitat and constitute a pool of biodiversity. By protecting soils and increasing their fertility, urban forests can help combat desertification, restore degraded soils and lands, and prevent drought and floods. The more heterogeneous, undisturbed and interconnected the green infrastructure, the more resilient the ecosystems will be.

- 50 tree species were planted, with care taken to select trees that will perform well on city streets in the project climate zone.
- All volunteers were trained in proper planting technique. Soil volume and quality was maximized for tree survival by removing the existing soil or fill replacing it with high quality loam. Following planting, a two-inch layer of wood chip mulch was applied, which will eventually break down and contribute to the organic matter in the soil.
- Maintenance of trees once they are planted is essential for their long-term survival. Trees planted through this project will be on a two-year watering schedule — performed either by a contractor hired by the City of Providence, or through a community watering project coordinated by the Providence Neighborhood Planting Program. Each tree will be watered 15-20 gallons of water weekly. Young trees may be pruned after the first few years of growth by the Providence Community Tree Keepers, and then added to the City's 10-year block pruning rotation.

SUSTAINABLE DEVELOPMENT GOAL 16

PROMOTE PEACEFUL AND INCLUSIVE SOCIETIES FOR SUSTAINABLE DEVELOPMENT, PROVIDE ACCESS TO JUSTICE FOR ALL AND BUILD EFFECTIVE, ACCOUNTABLE AND INCLUSIVE INSTITUTIONS AT ALL LEVELS



Target 16.7. Ensure responsive, inclusive, participatory, and representative decision-making at all levels

Inclusive partnerships between governments, the private sector and civil society are critical for success of achieving sustainable development goals.

- Project partners researched past and current sociocultural inequities and injustices. National, state, and local data supports the project area as a priority for expanding tree canopy. The area is designated by the RI Department of Health as a Health Equity Zone. Numerous tools such as the Environmental Justice Screen, Opportunity Atlas, and Tree Equity Score Analyzer show this area as a top priority. The City of Providence's 2020 Climate Justice Plan identified South Providence and Washington Park as one of the areas that has borne the brunt of environmental injustice. Mapping done by Groundwork Rhode Island as part of the Groundwork USA's Climate Safe Neighborhoods project shows the correlation of historically redlined neighborhoods with low tree canopy cover, higher amounts of impervious surface, higher heat vulnerability index and greater vulnerability to flooding.
- Historically, trees have been planted in Providence where they are requested by property owners. Since fewer people own their homes they are more vulnerable to rent hikes, displacement, and general lack of decision-making power.
- Project partners respectfully engaged residents and acknowledged past injustices. At an individual tree placement level, residents and stakeholders were given the opportunity to give input into the specific placement at each site. Partners met with tree recipients to talk through where the tree/s would go, discuss "right tree, right place" considerations and restraints related to utility and infrastructure, and make sure that they felt informed and comfortable with the placement decision and species selection.

SUSTAINABLE DEVELOPMENT GOAL 17

STRENGTHEN THE MEANS OF IMPLEMENTATION AND REVITALIZE THE GLOBAL PARTNERSHIP FOR SUSTAINABLE DEVELOPMENT



Target 17.17. Multi-stakeholder partnerships - Encourage and promote effective public, public-private, and civil society partnerships and resourcing strategies

Inclusive partnerships between governments, the private sector and civil society are critical for success of achieving sustainable development goals.

- The planning and implementation for this project was executed collaboratively by PNPP, the Providence Forestry Division, Groundwork RI, students and staff at the participating schools, the Providence Housing Authority, members of the Providence (PVD) Tree Plan Steering Committee, and community members and residents.
- The project was woven together with the concurrent project to create the Providence (PVD) Tree Plan: a community-led, multi-stakeholder, justice-focused strategic plan for creating a more equitable, vibrant and resilient urban forest in Providence. PNPP, Groundwork RI, Providence Forestry are some of the lead partners in the development of the PVD Tree Plan. This community-based planting project was an excellent opportunity to connect further with residents of low-canopy neighborhoods and communities who have been traditionally excluded from planning processes, and to gather their input and expertise and engage them with the work of the PVD Tree Plan.
- Much of the design and scope of the project was informed and led by member of the community, and the engagement process involved meeting community members where they were at and connecting to their social and cultural spaces and networks.
- A partnership with Juanita Sanchez Educational Complex (JSEC) was initiated when 360 High School Green Alliance Ecology Club, an after-school youth-led club, reached out to PNPP in the summer of 2021 to ask about getting trees for the campus. The Green Alliance youth ended up taking a key leadership role in the project overall, with support from multiple teachers and staff members.
- Students and community members were empowered to plug in, develop social capital and take ownership of the tree planting projects that will lead to increased health and resiliency.